

THE GREEN SUN OF THE KRAKATOA ERUPTION.

Referring to page 163 of the MONTHLY WEATHER REVIEW for April, 1906, wherein, speaking of the color of dust haze, the Editor states that the whiteness of the diatom dust in the harmattan is a diffraction phenomenon, produced by the action of minute irregular objects upon a beam of light, Prof. R. W. Wood remarks:

The green sun observed thru the haze attending the Krakatoa eruption could never have been produced by diffraction, and I doubt if it is a thin plate phenomenon due to the passage of light thru the centers of small globules, as in the experiments of Prof. Carl Barus. I favor the explanation given by Prof. C. Michie Smith, in the Proceedings of the Royal Society of Edinburgh, Vol. XIII, page 116, where he says: "I have discovered that the green sun spectrum can be exactly represented by combining the spectrum of the sun seen thru a fairly thick mist and the spectrum of a moist atmosphere showing the rain bands strongly".

If plenty of water vapor will, by absorption, cut off enough of the red end, that is all that is necessary, as the rest of the spectrum would have a greenish appearance, which would be more marked if the violet and the blue were removed by haze. I should expect that sufficient water vapor would greatly cut down the red end, tho I am quite sure that no one has ever worked with a long enough column of dense water vapor to observe any coloring. Janssen worked with a column over a hundred feet long (a tube filled with steam at seven atmospheres), and observed a strong absorption of blue and violet. He attributed this to the vapor, but it is more probable that it was due to a haze of condensed steam. Why not work with an optical path of much greater length? A pressure of one hundred atmospheres could probably be used without trouble. But this experiment could not be done properly without very carefully constructed apparatus, the cost of which would be considerable.

INTERNATIONAL WEATHER CABLEGRAMS.

In accordance with arrangements between the Chief of the Weather Bureau and the director of the Central Physical Observatory observations from several Russian stations will be reported daily by telegraph and cable from St. Petersburg to the Central Office of the Weather Bureau at Washington. To begin with the 7 a. m., local time, observations at Irkutsk, Tomsk, and Ekaterinburg will be sent, the barometric readings and the direction and force of the wind only being reported by the use of the cipher weather code that will convey in one word for each station the information desired. The Chief of Bureau appreciates very highly the cooperation in the work of international meteorology of the Central Physical Observatory, whose general director, M. Rykachev, has done so much to stimulate studies into the general dynamics of the atmosphere.

It may not be generally known that for several years the Central Office at Washington has been receiving and publishing daily cable reports from three stations in Ireland, two in Scotland, one each in England, Germany, France, Portugal, the Azores, and Bermuda, and about twelve in the West Indies, and that since the establishment of cable communication with the Hawaiian Islands daily weather reports have been received from Honolulu. It will be of interest to know that preliminary steps for the inauguration of a similar service of reports from points in Alaska have been taken, and that with the completion and operation of the Iceland cable a daily service from that quarter is contemplated.

The extension of the area of daily weather reports is being made for the purpose of determining the relation and interrelation of barometric conditions over the oceans and the continents, and the discovery of this relation, that will undoubtedly be made by a study of the reports, will open the way for greater achievements in the accuracy and the period of weather forecasting.—E. B. G.

Mr. H. M. Watts, of the Philadelphia Press, in a recent communication to the Philadelphia Academy of Natural Sciences, pointed out that a new epoch in meteorological research is about to dawn, in that the Weather Bureau is

soon to receive daily telegraph and cable reports from new regions of the Northern Hemisphere, which are meteorologically very important. In explaining the significance of this Mr. Watts went into a careful survey of the great basic causes of variations in weather and climate. The variations in solar radiation appear to have some effect on the great permanent anticyclones, whose slight changes of intensity and location so greatly affect the paths of storms.

Furthermore, Mr. Watts called attention to the fact that at Mount Weather the Bureau will prosecute studies of the variations in all the solar functions, in connection with researches in the elements of the earth's atmospheric envelope.

THE ZODIACAL LIGHT.¹

By Prof. ARTHUR SEARLE. Dated Harvard College Observatory, Cambridge, Mass., October 1, 1906.

The prolonged and careful series of observations of the zodiacal light made by Mr. Maxwell Hall, which appeared in the MONTHLY WEATHER REVIEW for March, 1906, Vol. XXXIV, p. 126, forms a welcome addition to our previous information. Its value is increased by the circumstance that the observer was apparently free from any prejudice which might have resulted from a too extensive acquaintance with the work of other inquirers into the same subject. Observations of the zodiacal light are certainly best made without much knowledge of what has been the experience of others. When deductions are to be made from such observations, however, the student should know as much as possible about the existing material for discussion.

Unfortunately, it has hitherto been customary for each observer to draw his own conclusions almost exclusively from his own observations, and the consequence has been the production of a considerable mass of speculation tending rather to encumber than to assist the progress of definite research. In the present article all reference to theories of the zodiacal light will be avoided. Its purposes are—First, to bring together some facts which seem to be of interest, in view of Mr. Hall's work, and of the editorial comments which follow it; Second, to present suggestions which may be of use to future observers.

The question whether the altitude of the observer's station affects the visibility of the zodiacal light is raised in the editorial comments just mentioned, and seems capable of a fairly conclusive answer. The altitude of Mr. Hall's own station was only 1800 feet; but he quotes observations made by Professor Newcomb in Switzerland at the altitude of 8000 feet. Some additional records of observations made at considerable altitudes are given below.

1. Alexander von Humboldt: "Cosmos", English translation by Otté, published in Bohn's Scientific Library, London, 1849. Volume I of this work, at page 126, contains this passage relating to the zodiacal light:

I have seen it shine with an intensity of light equal to the milky way in Sagittarius, and that not only in the rare and dry atmosphere of the summits of the Andes, at an elevation of from thirteen to fifteen thousand feet, but even on the boundless grassy plains, the Llanos of Venezuela, and on the seashore, beneath the ever clear sky of Cumana.

Humboldt seems, by this statement, to have presumed that the zodiacal light would be best seen at great elevations, and actually to have found that it was seen at least as well from the tops of mountains as at lower levels. His South American journeys were made in the years 1799–1804.

2. C. Piazzzi Smyth: "Report on the Teneriffe Astronomical Experiment of 1856, London and Edinburgh, 1858". During the months of July, August, and September, 1856, Smyth made

¹ As this article by Prof. Arthur Searle definitely settles the old question as to whether the zodiacal light and gegenschein are atmospheric or celestial phenomena, we shall hereafter commend the publication of such material to the astronomical journals, and reserve the columns of the MONTHLY WEATHER REVIEW for meteorology proper.—EDITOR.